What is Claimed is:

1. A radial impeller comprising:

a hub attachable to a rotating shaft;

an impeller body attached to the hub and extending radially from the hub to a perimeter of the impeller and having opposed radial faces; and

a plurality of impeller blades disposed on one face of the impeller body, each impeller blade extending from a leading end of the blade generally adjacent the hub toward a trailing end of the blade generally at the perimeter of the impeller, wherein an inlet area is defined between each pair of adjacent blades generally adjacent the hub, with each inlet area being defined as the area at the radius of the leading end of the adjacent blades bounded by a height of the leading end of the adjacent blades and the one face of the impeller body, and wherein an outlet area is defined between each pair of adjacent blades generally adjacent the perimeter of the impeller, with each outlet area being defined as the area at the radius of the trailing end of the adjacent blades bounded by the height of the trailing end of the adjacent blades and the one face of the impeller body, wherein each inlet area is substantially equal to each corresponding outlet area for each pair of adjacent blades.

2. The radial impeller of claim 1, further comprising partial blades disposed on the one face of the impeller body between each pair of blades, wherein the partial blades extend from a position radially outward of the inlet area to the perimeter of the impeller.

3. The radial impeller of claim 1, further comprising an axially extending skirt attached to the impeller body at the perimeter of the impeller, the skirt extending from an opposite face of the impeller body.

4. The radial impeller of claim 1, wherein the blades are backward curved blades generally decreasing in height from the leading end to the trailing end.

5. The radial impeller of claim 1, wherein the hub includes a smooth outer surface curving radially outwardly toward the inlet areas.

6. The radial impeller of claim 1, wherein the impeller is a one-piece, injection molded impeller.

7. The radial impeller of claim 1, wherein a radial area between adjacent blades, which is an area between adjacent blades at a radial position from the hub and that is bounded by the height of the adjacent blades at the radial position and the one face of the impeller body, is substantially the same over a length of the pair of adjacent blades.

8. A pressure generator comprising:

(a) a housing having a gas inlet and a gas outlet;

(b) a motor;

(c) a rotatable drive shaft driven by the motor; and

(d) an impeller mounted on the drive shaft and disposed within the housing, the impeller comprising:

(1) a hub attached to the drive shaft,

(2) an impeller body attached to the hub extending radially from the hub to a perimeter of the impeller, and

(3) a plurality of impeller blades disposed on one face of the impeller body, each impeller blade extending from a leading end of the blade generally adjacent the hub toward a trailing end of the blade generally at the perimeter of the impeller, wherein an inlet area is defined between each pair of adjacent blades generally adjacent the hub, with each inlet area being defined as the area at the radius of the leading end of the adjacent blades bounded by a height of the leading end of the adjacent blades and the one face of the impeller body, and wherein an outlet area is defined between each pair of adjacent blades generally adjacent the perimeter of the impeller, with each outlet area being defined as the area at the radius of the trailing end of the adjacent blades bounded by the height of the trailing end of the adjacent blades and the one face of the impeller body, wherein each inlet area is substantially equal to each corresponding outlet area for each pair of adjacent blades.

9. The pressure generator of claim 8, further comprising partial blades disposed on the one face of the impeller body between each pair of blades, wherein the partial blades extend from a position radially outward of the inlet area to the perimeter of the impeller.

10. The pressure generator of claim 8, further comprising an axially extending skirt attached to the impeller body at the perimeter of the impeller, the skirt extending from an opposite face of the impeller body.

11. The pressure generator of claim 8, wherein the blades are backward curved blades generally decreasing in height from the leading end to the trailing end.

12. The pressure generator of claim 8, wherein the hub includes a smooth outer surface curving radially outwardly toward the plurality of inlet areas.

13. The pressure generator of claim 8, wherein the housing outlet has an arithmetically increasing cross sectional area extending at least partially around the perimeter of the impeller.

14. The pressure generator of claim 8, wherein the housing follows the contour of the height of the blades.

15. The pressure generator of claim 8, wherein a radial area between adjacent blades, which is an area between adjacent blades at a radial position from the hub and that is bounded by the height of the adjacent blades at the radial position and the one face of the impeller body, is substantially the same over a length of the pair of adjacent blades.

16. A pressure support system adapted to deliver a flow of breathing gas to an airway of a patient, the pressure generating system comprising:

(a) a source of breathing gas;

(b) a pressure generator adapted to generate a flow of breathing gas, the pressure generator comprising:

(1) a housing having a gas inlet and a gas outlet,

(2) a motor,

(3) a rotatable drive shaft driven by the motor, and

(4) an impeller mounted on the drive shaft and disposed within the housing, the impeller comprising:

(i) a hub attached to the drive shaft,

(ii) an impeller body attached to the hub extending radially from the hub to a perimeter of the impeller, and

(iii) a plurality of impeller blades disposed on one face of the impeller body, each impeller blade extending from a leading end of the blade generally adjacent the hub toward a trailing end of the blade generally at the perimeter of the impeller, wherein an inlet area is defined between each pair of adjacent blades generally adjacent the hub, with each inlet area being defined as the area at the radius of the leading end of the adjacent blades bounded by a height of the leading end of the adjacent blades and the one face of the impeller body, and wherein an outlet area is defined between each pair of

adjacent blades generally adjacent the perimeter of the impeller, with each outlet area being defined as the area at the radius of the trailing end of the adjacent blades bounded by the height of the trailing end of the adjacent blades and the one face of the impeller body, wherein each inlet area is substantially equal to each corresponding outlet area for each pair of adjacent blades; and

(c) a patient circuit operatively coupled to the gas outlet of the housing for delivering the flow of breathing gas from the gas outlet to an airway of a patient.

17. The pressure support system of claim 16, further comprising partial blades disposed on the one face of the impeller body between each pair of blades, wherein the partial blades extend from a position radially outward of the inlet area to the perimeter of the impeller.

18. The pressure support system of claim 16, further comprising an axially extending skirt attached to the impeller body on the perimeter of the impeller, the skirt extending from an opposite face of the impeller body.

19. The pressure support system of claim 16, wherein the blades are backward curved blades generally decreasing in height from the leading end to the trailing end.

20. The pressure support system of claim 16, wherein the hub includes a smooth outer surface curving radially outwardly toward the plurality of inlet areas.

21. The pressure support system of claim 16, wherein the housing outlet has an arithmetically increasing cross sectional area extending at least partially around the perimeter of the impeller.

22. The pressure support system of claim 16, wherein the housing follows the contour of the height of the blades.

23. The pressure support system of claim 16, wherein a radial area between adjacent blades, which is an area between adjacent blades at a radial position from the hub and that is bounded by the height of the adjacent blades at the radial position and the one face of the impeller body, is substantially the same over a length of the pair of adjacent blades.

24. A method of supplying a flow of gas comprising:

(a) providing a source of gas;

(b) pressurizing the gas to a selected constant pressure in a pressure generating system comprising:

(1) a housing having a gas inlet and a gas outlet,

(2) a motor,

(3) a rotatable drive shaft driven by the motor, and

(4) an impeller mounted on the drive shaft and disposed within the housing, the impeller comprising:

(i) a hub attached to the drive shaft,

(i) an impeller body attached to the hub extending radially from the hub to a perimeter of the impeller, and

(iii) a plurality of impeller blades disposed on one face of the impeller body, each impeller blade extending from a leading end of the blade generally adjacent the hub toward a trailing end of the blade generally at the perimeter of the impeller, wherein an inlet area is defined between each pair of adjacent blades generally adjacent the hub, with each inlet area being defined as the area at the radius of the leading end of the adjacent blades bounded by a height of the leading end of the adjacent blades and the one face of the impeller body, and wherein an outlet area is defined between each pair of adjacent blades generally adjacent the perimeter of the impeller, with each outlet area being defined as the area at the radius of the trailing end of the adjacent blades bounded by the height of the trailing end of the adjacent blades and the one face of the impeller body, wherein each inlet area is substantially equal to each corresponding outlet area for each pair of adjacent blades; and

c) delivering the pressurized gas to an external location using a gas carrying conduit coupled to the gas outlet of the housing.

25. A pressure support system adapted to generate a flow of breathing gas for delivery to an airway of a patient, the pressure generating system comprising:

(a) a source of breathing gas;

(b) a pressure generator comprising:

(1) a motor,

(2) a rotatable drive shaft driven by the motor, and

(3) an impeller mounted on the drive shaft, wherein the impeller is configured and arranged such that the pressure generator delivers a substantially constant pressure over a range of flows output from the pressure generator from 10-150 l/min, wherein the substantially constant pressure is a pressure selected from a range of pressures from 10-65 cmH_2O; and

(c) a patient circuit operatively coupled to the pressure generator and adapted to deliver the flow of breathing gas from the pressure generator to an airway of a patient.

26. The pressure support system of claim 25, wherein the pressure generator outputs a flow of breathing gas such that at a standard deviation from a selected pressure, which is a pressure within a range of pressures from 10-65 cmH_20 is not greater than 1.5 cmH_2O.

27. The pressure support system of claim 25, wherein the pressure generator outputs breathing gas such at a constant rotational speed, as the output flow increases, the

substantially constant pressure increases slightly over at least a portion of the range of flows from 10-150 l/min.

28. The pressure support system of claim 25, further including noise reduction means associated with the impeller for reducing noise generating during operation of the pressure generating system.

29. The pressure support system of claim 25, further including an impeller balance means associated with the impeller body for balancing the impeller.

30. The pressure support system of claim 29, wherein the impeller balance means includes an axially extending skirt attached to a perimeter of the impeller.

31. A method of supplying gas comprising:

(a) providing a source of breathing gas;

(b) providing a pressure generator comprising:

(1) a motor,

(2) a rotatable drive shaft driven by the motor, and

(3) an impeller mounted on the drive shaft;

(c) pressurizing gas from the source of breathing gas via the pressure generator such that the pressure generator outputs a substantially constant pressure over a range of

flows from 10-150 l/min, wherein the pressure generator delivers the substantially constant pressure, which is a pressure selected from a range of pressures between 10-65 cmH_2O; and

(d) supplying the pressurized gas from the pressure generator to the patient through a patient circuit.

32. The method of claim 31, wherein pressuring the gas includes outputting the flow of breathing gas such that at a standard deviation from a selected pressure, which is a pressure selected form a range of pressure from 10-65 cmH_20, is not greater than 1.5 cmH_2O.

33. The method of claim 31, wherein pressuring the gas includes outputting the flow of breathing gas such, at a constant rotational speed, as the output flow increases, the substantially constant pressure increases slightly over at least a portion of the range of flows from 10-150 l/min.